US006910509B1

(12) **United States Patent**
Wheeler et al.

(10) **Patent No.: US 6,910,509 B1**
(45) **Date of Patent: Jun. 28, 2005**

(54) **WINDSHIELD WASHER FLUID DISPENSER**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/909,094**

(22) Filed: **Jul. 30, 2004**

(51) **Int. Cl.**[7] **B65B 1/04**
(52) **U.S. Cl.** **141/2**; 141/18; 141/94; 141/198; 222/64; 222/2; 222/74
(58) **Field of Search** 141/1, 5, 18, 67, 141/94, 95, 192, 198; 222/64, 2, 74, 75

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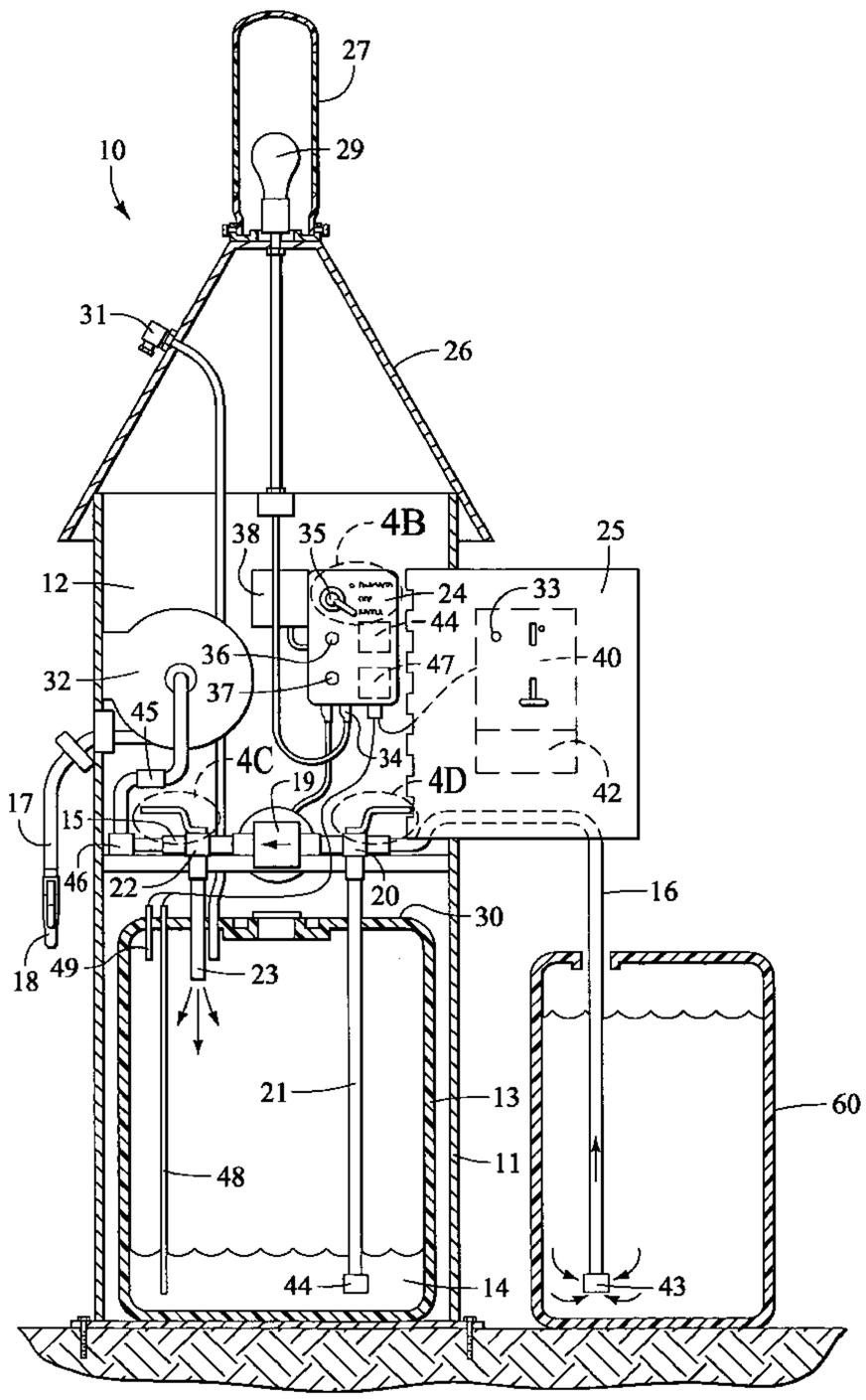
(57) **ABSTRACT**

A windshield washer fluid dispenser apparatus is described for selectively filling a vehicle windshield washer fluid reservoir. In another aspect, a process for refilling a windshield washer fluid dispenser apparatus is also described. As a third aspect, a process for discharging a quantity of windshield washer fluid directly into a vehicle windshield washer fluid reservoir is described.

49 Claims, 6 Drawing Sheets



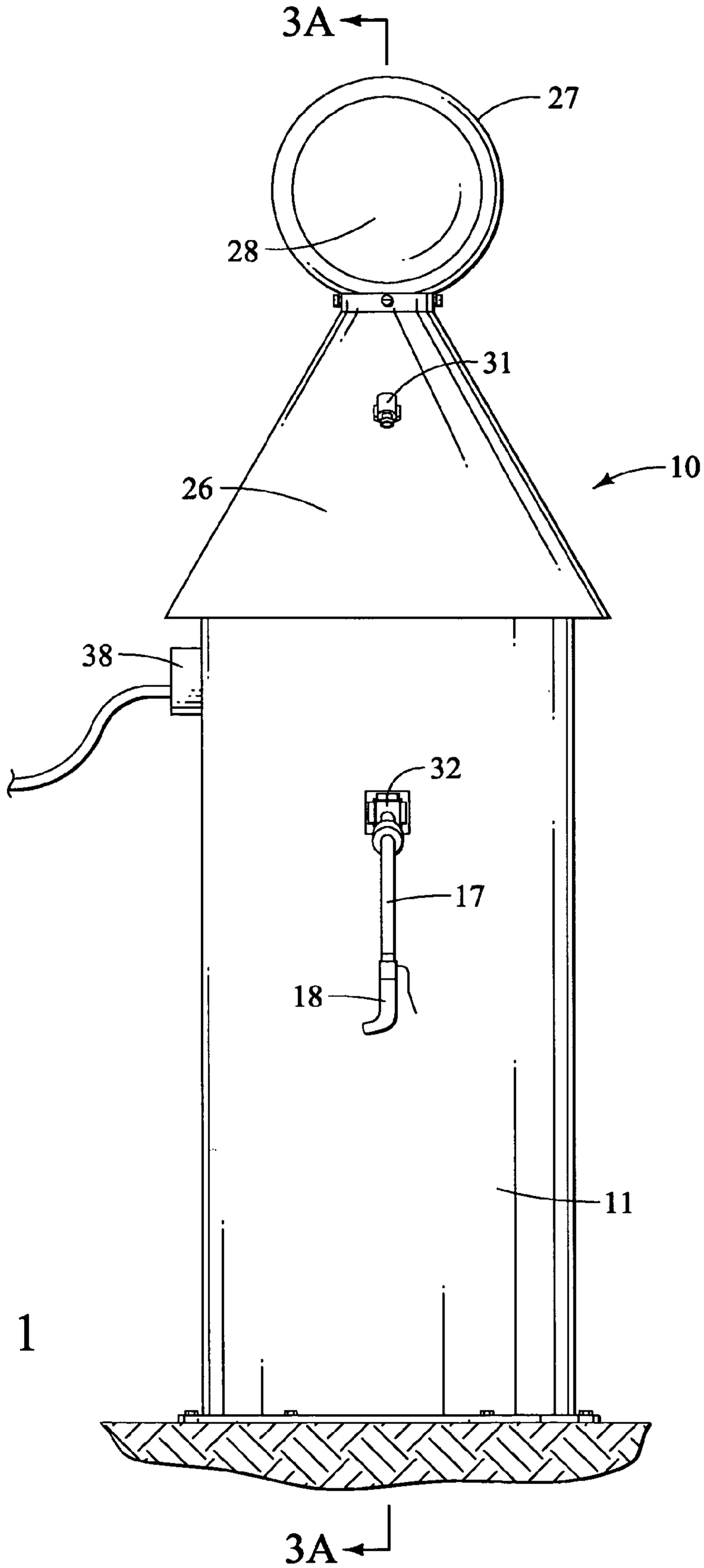


FIG. 1

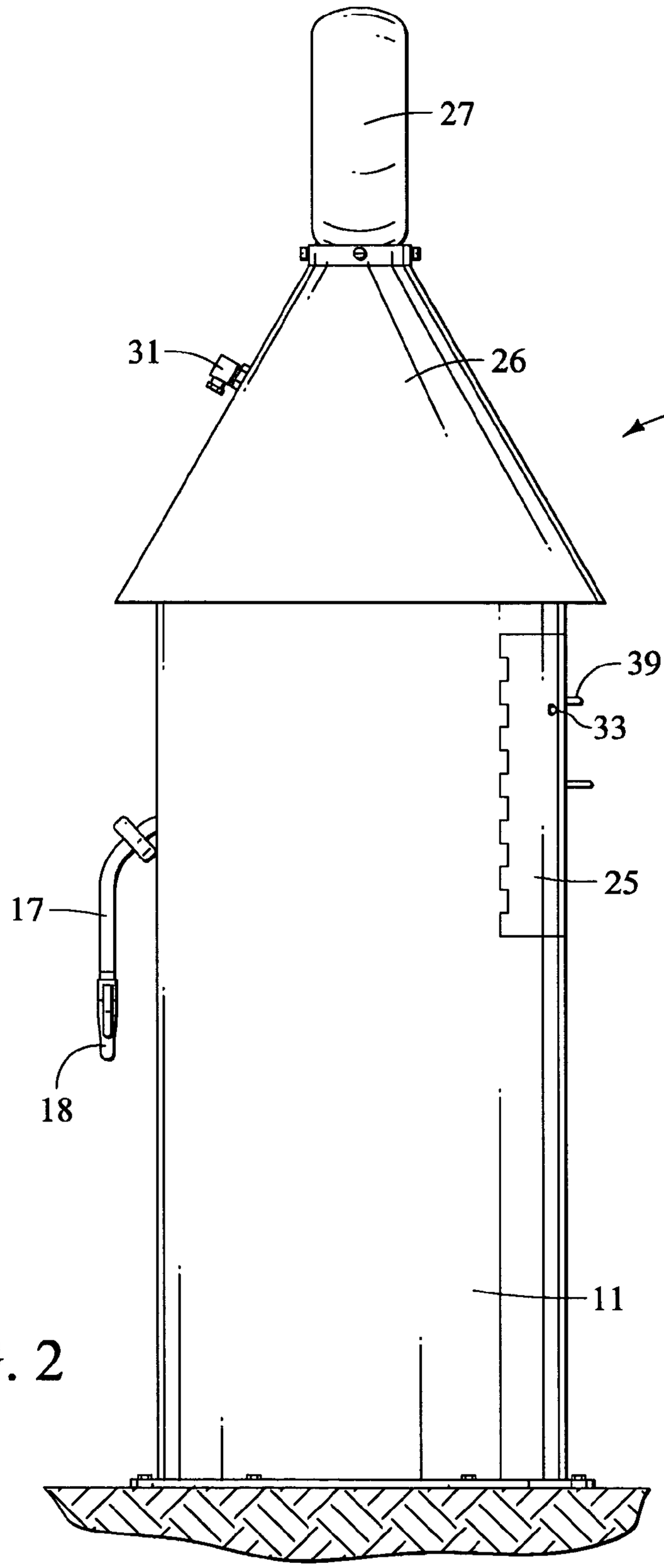


FIG. 2

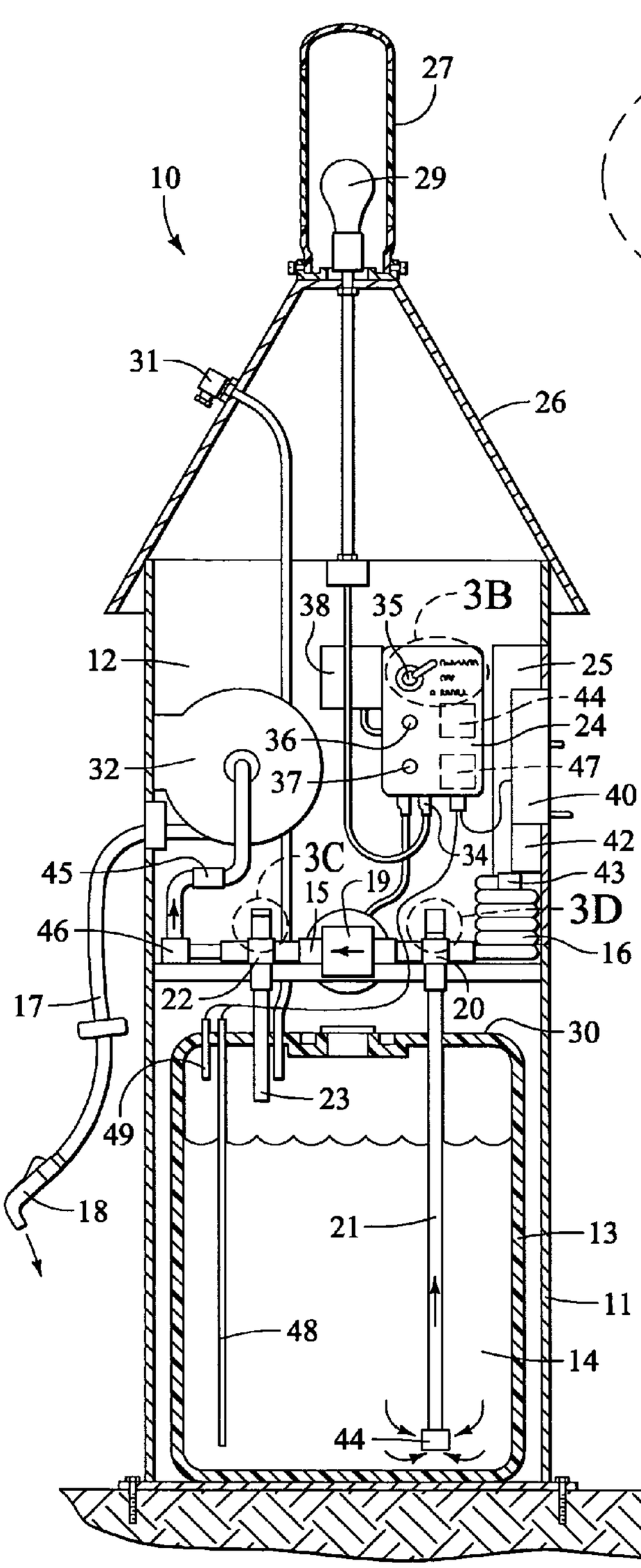


FIG. 3A

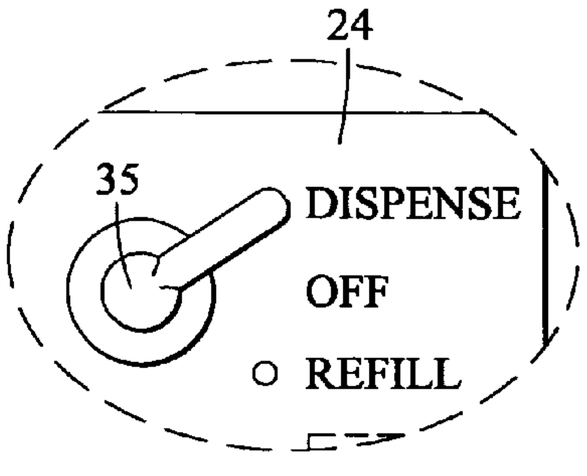


FIG. 3B

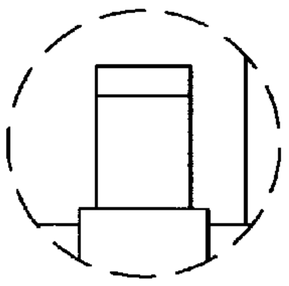


FIG. 3C

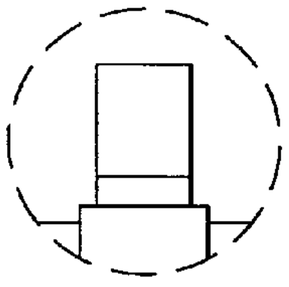


FIG. 3D

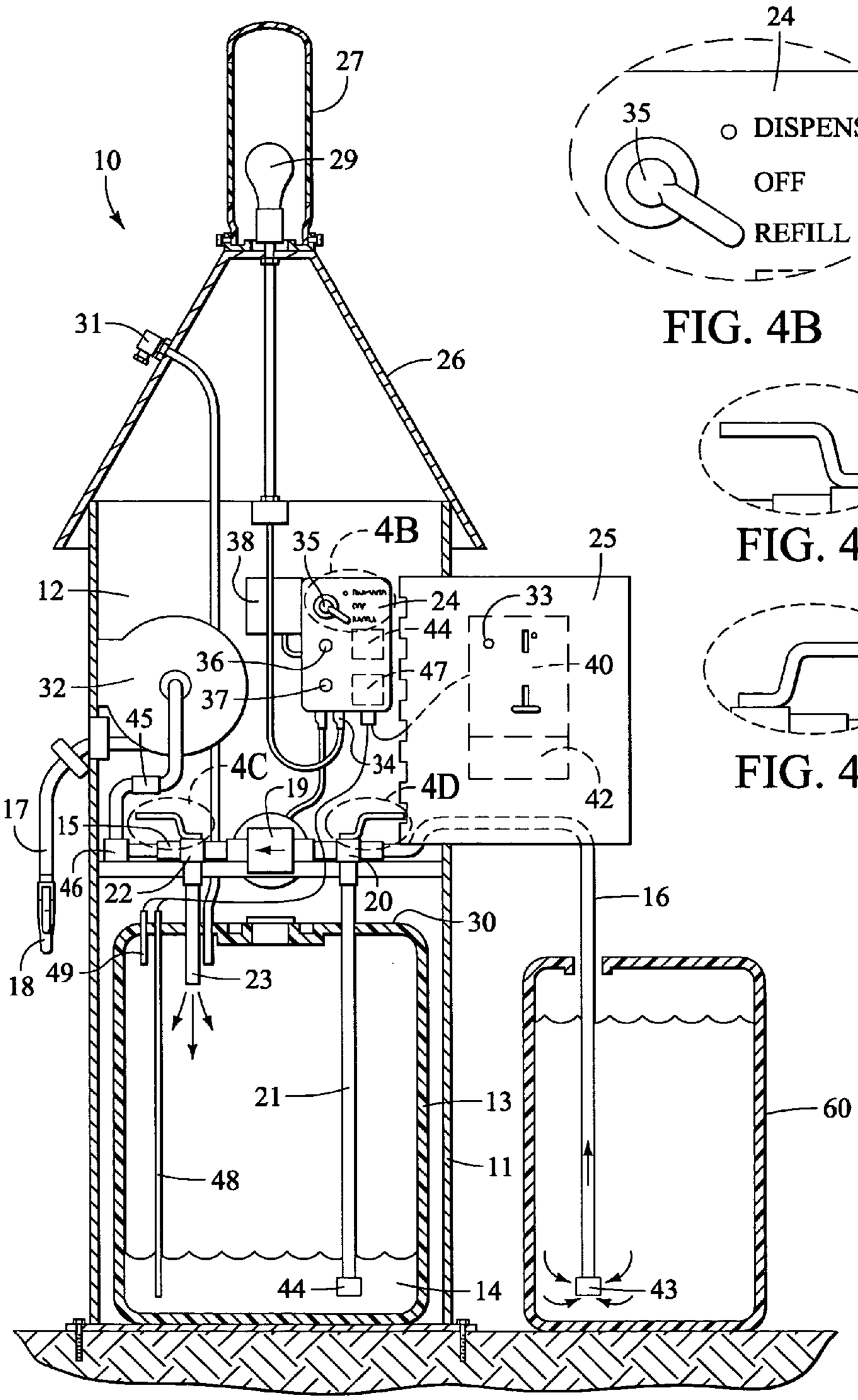


FIG. 4A

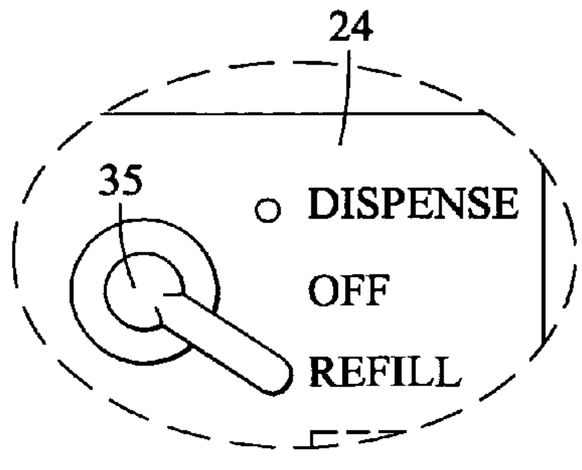


FIG. 4B

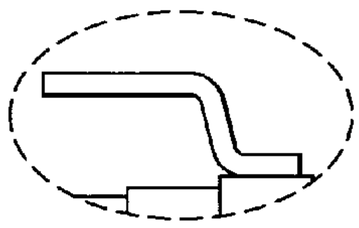


FIG. 4C

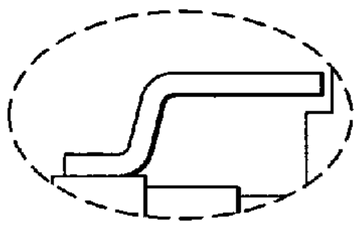


FIG. 4D

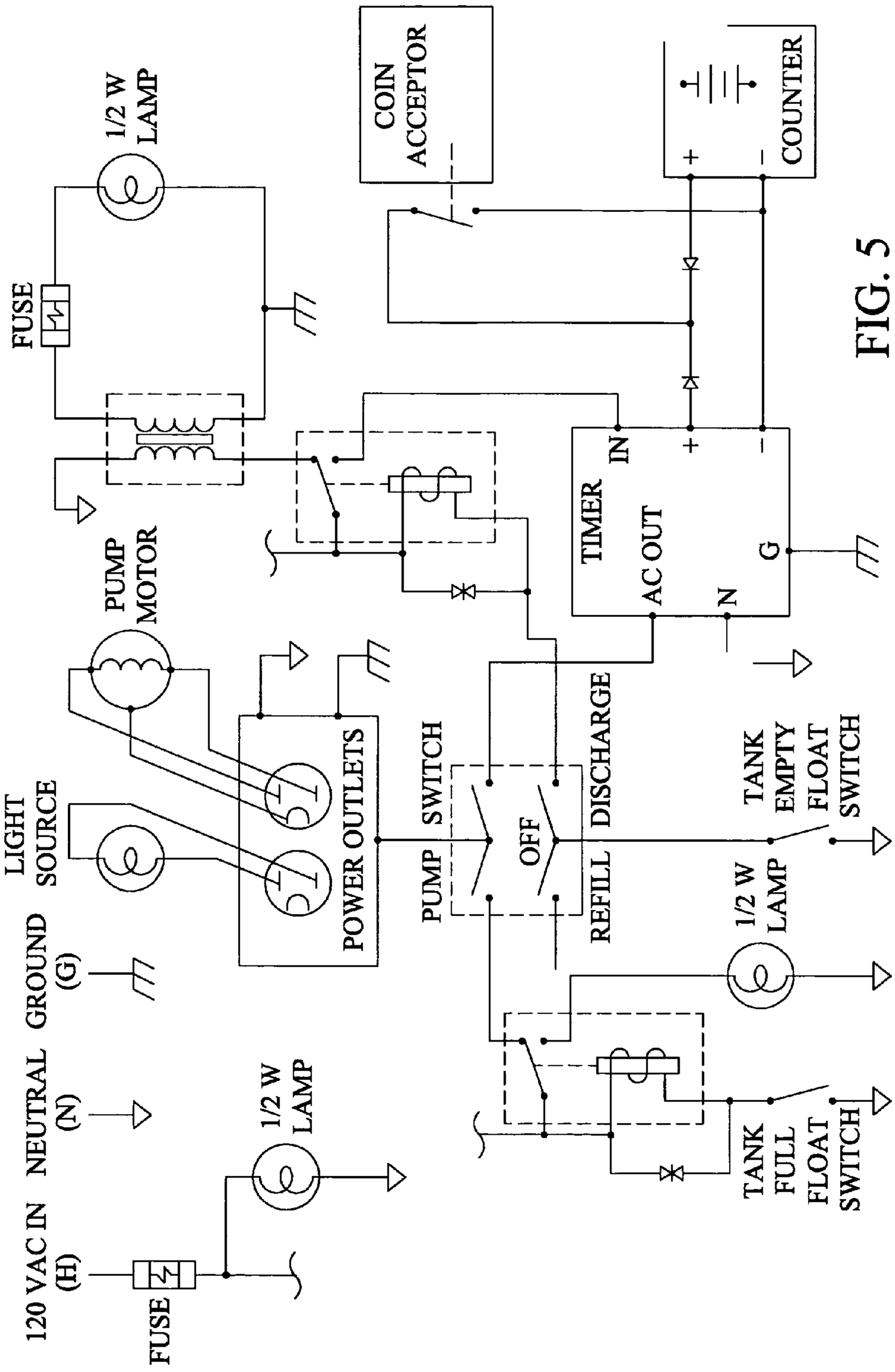

120 VAC IN (H)
NEUTRAL (N)
GROUND (G)
FUSE
1/2 W LAMP
LIGHT SOURCE
PUMP MOTOR
POWER OUTLETS
COIN ACCEPTOR
PUMP SWITCH
OFF
DISCHARGE
REFILL
TIMER
IN
AC OUT
N
G
COUNTER
TANK EMPTY FLOAT SWITCH
TANK FULL FLOAT SWITCH

FIG. 5

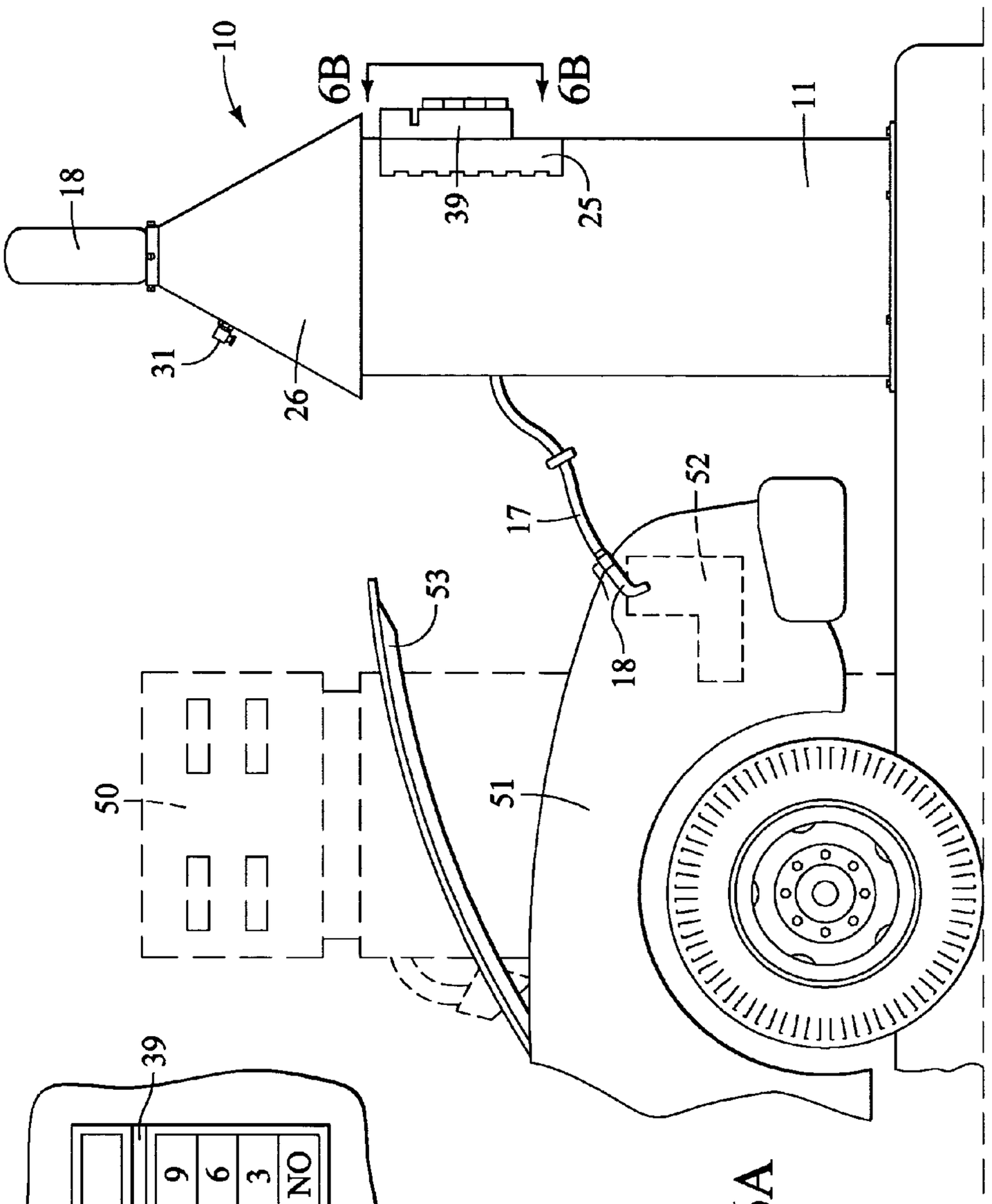

10
6B
6B
11
18
39
25
31
26
17
52
53
18
50
51

FIG. 6A

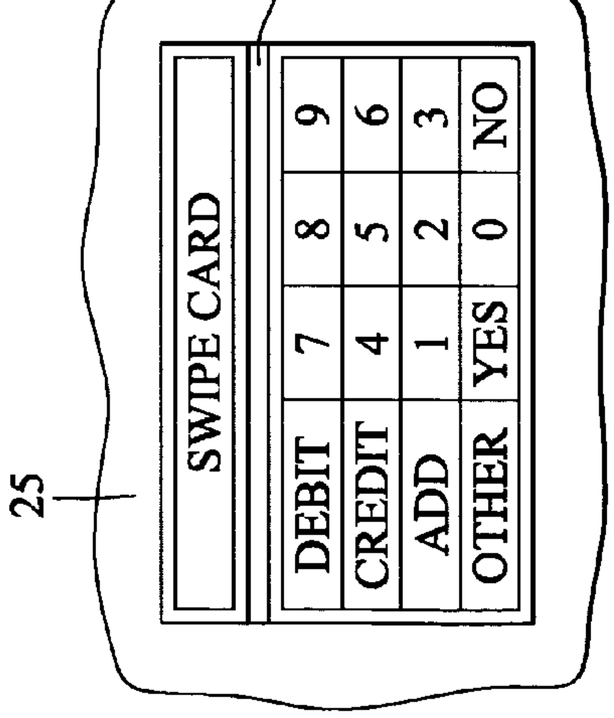

39
SWIPE CARD
DEBIT 7 8 9
CREDIT 4 5 6
ADD 1 2 3
OTHER YES 0 NO
25

FIG. 6B

WINDSHIELD WASHER FLUID DISPENSER

CROSS REFERENCE TO RELATED APPLICATIONS

There are no other applications related to the present application.

BACKGROUND

Vehicles including cars, trucks, motor homes and the like typically have reservoirs and pumps that can be selectively activated to spray windshield washer fluid on the vehicle windshield. Such windshield washer fluid, in conjunction with the vehicle windshield wipers, cleans or otherwise removes undesirable dirt, bugs or other matter from the outer surface of the windshield.

Vehicle windshield washer fluid reservoirs vary in shape and size, but typically will hold a supply of at least a quart of water or windshield washer fluid. The windshield washer fluid supply will diminish with use and the vehicle operator often finds that the fluid has been totally depleted at an inappropriate time.

Under these circumstances an operator usually makes a special trip to a retail outlet where the windshield washer fluid is sold and purchases a one-gallon container of windshield washer fluid. Since the amount of fluid in these containers is typically more than the vehicle windshield washer fluid reservoir will hold, after filling the reservoir the operator will either dispose of the surplus windshield washer fluid or temporarily store the surplus fluid in its open container in the trunk or other storage area of the vehicle. It is not uncommon, given the latter event, that the container works itself open after a period of time, spilling the surplus windshield washer fluid in the vehicle.

At a later date, when the supply of windshield washer fluid in the vehicle windshield washer fluid reservoir is again depleted, the vehicle user must then either use the surplus fluid from the previous purchase (if available) or buy more windshield washer fluid. In the former event, there may not be enough surplus fluid to fill the vehicle windshield washer fluid reservoir a second time. In the latter event, the user is now saddled with two containers.

It is unusual that a full windshield washer fluid reservoir will become fully depleted between vehicle fuel fillings. Thus, if the vehicle operator had access to windshield washer fluid each time the vehicle refueled, the vehicle windshield washer fluid reservoir would not likely become depleted at an inappropriate time.

A need has therefore been evidenced for a windshield washer fluid dispenser that can be associated with a fuel filling station or other convenient location where a vehicle is regularly maintained or kept. The present invention fills this need, as will be understood from the following description and accompanying drawings.

SUMMARY

In one aspect, the present invention provides for an apparatus to dispense windshield washer fluid. The apparatus generally comprises a base housing, a means to access an interior space of the base housing, a power source capable of rendering electric current to operate the apparatus, a fluid container within the interior space capable of containing a supply of windshield washer fluid, an intake line, a discharge line, a fluid pump assembly configurable to refill the contents of the fluid container or discharge the contents of the fluid container and a means for authorizing use of the windshield washer fluid dispenser. In a preferred embodiment of the apparatus, the apparatus further comprises a display cap with display surfaces, a totalizer and a coin counter.

In another aspect, the present invention provides a process of replenishing or refilling the windshield washer fluid dispenser. The process generally comprises providing a windshield washer fluid dispenser, gaining access to the windshield washer fluid dispenser, acquiring the intake line and configuring the apparatus such that a quantity of fluid is transferred from an external bulk container to a fluid container within the windshield washer fluid dispenser.

In yet another aspect, the present invention provides a process to dispense windshield washer fluid from the windshield washer fluid dispenser. The process namely comprises providing a windshield washer fluid dispenser and a vehicle windshield washer fluid reservoir, obtaining authorization to use the windshield washer fluid dispenser, extending the discharge line to the vehicle windshield washer fluid reservoir and thereby permitting flow of the windshield washer fluid from the windshield washer fluid dispenser into the vehicle windshield washer fluid reservoir.

Other embodiments, and other features and objects of the present invention will be in part apparent to those skilled in the art and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention may be readily obtained by reference to the following descriptions when considered in connection with the accompanying drawings, wherein:

FIG. **1** is a frontal view of an embodiment of a windshield washer fluid dispenser;

FIG. **2** is a side view of an embodiment of a windshield washer fluid dispenser;

FIG. **3***a* is the cross sectional view of an embodiment similar to FIG. **2**, configured for the discharging process;

FIG. **3***b* is the enlarged view of the configuration of the pump switch depicted in FIG. **3***a*, wherein the pump switch is configured for the discharging process;

FIG. **3***c* is the enlarged view of the configuration of the output valve depicted in FIG. **3***a*, wherein the output valve is configured for the discharging process;

FIG. **3***d* is the enlarged view of the configuration of the input valve depicted in FIG. **3***a*, wherein the input valve is configured for the discharging process;

FIG. **4***a* is the cross sectional view of an embodiment similar to FIG. **2**, configured for the refilling process;

FIG. **4***b* is the enlarged view of the configuration of the pump switch depicted in FIG. **4***a*, wherein the pump switch is configured for the refilling process;

FIG. **4***c* is the enlarged view of the configuration of the output valve depicted in FIG. **4***a*, wherein the output valve is configured for the refilling process;

FIG. **4***d* is the enlarged view of the configuration of the input valve depicted in FIG. **3***a*, wherein the input valve is configured for the refilling process;

FIG. **5** is a schematic view of electronic circuitry of an embodiment of a windshield washer fluid dispenser; and

FIG. **6** is a schematic view illustrating an embodiment of a windshield washer fluid dispenser configured to discharge windshield washer fluid into a vehicle windshield washer fluid reservoir.

DESCRIPTION OF PREFERRED EMBODIMENTS

This disclosure of the present invention is submitted in furtherance of the constitutional purposes of the U.S. Patent Laws "to promote the progress of science and useful arts" (Article 1, Section 8). Before relating specific details of preferred elements of the invention, general statements describing preferred aspects of the invention will be given. Headers and cross-references appearing within the following paragraphs are intended for the convenience of the reader and should not be interpreted to restrict the scope of the discussion presented at any respective location.

GENERAL DESCRIPTION

A first aspect of the invention includes a windshield washer fluid dispenser **10** (FIGS. **1–4**, **6**) for selectively filling a vehicle windshield washer fluid reservoir **52** (FIG. **6**). Embodiments of the windshield washer fluid dispenser **10** provide a base housing **11** that define an interior space **12**, thereby protecting internal structures and components of the windshield washer fluid dispenser **10**. A fluid container **13** is situated or otherwise disposed within the interior space **12**, thereby capable of containing a supply of windshield washer fluid **14**.

The windshield washer fluid dispenser **10** further comprises a fluid pump assembly **15** disposed within its interior space **12**, thereby selectively providing a means of refilling the fluid container **13** through an intake line **16** and providing a means of discharging the contents of the fluid container **13** through a discharge line **17**.

The intake line **16** is typically of sufficient length to extend from the fluid pump assembly **15** to an external bulk container **60** containing bulk windshield washer fluid or other appropriate fluids. During the refilling process, one end of the intake line **16** environmentally communicates with the fluid pump assembly **15** while the other end of the intake line **16** is selectively received within the external bulk container **60** (see FIG. **4***a*). During the discharge process, the intake line **16** is typically coiled within the interior space **12** of the apparatus (see FIG. **3***a*).

The discharge line **17** is typically of sufficient length to extend from the fluid pump assembly **15** to the vehicle windshield washer fluid reservoir **52**. One end of the discharge line **17** environmentally communicates with the fluid pump assembly **15** while the other end of the discharge line **17** terminates at a discharge end. Adjacent to or at the discharge end, a discharge line **17** will typically have a discharge valve **18** allowing a customer to selectively allow or disallow fluid to be discharged through the discharge line **17**.

Typically, the fluid pump assembly **15** is further comprised of a pump **19**, an input valve **20**, a first container line **21**, an output valve **22** and a second container line **23**. Specific configurations of the input valve **20** and the output valve **22**, as discussed in further detail in the following paragraphs, allows the apparatus to be selectively configured to refill the fluid container **13** with fluid through the intake line **16** or alternatively configured to discharge the supply of windshield washer fluid **14** through the discharge line **17** to a vehicle windshield washer fluid reservoir **52**.

A control panel **24** is further disposed within the interior space **12** of the apparatus, serving a number of functions, including: routing power to various components of the apparatus, controlling the pump **19** and providing visual indications of the status of the apparatus.

Second and third aspects of the invention involve processes to refill the fluid container **13** and discharge windshield washer fluid into a vehicle windshield washer fluid reservoir **52**, respectively. These processes shall be further described subsequent to a more detailed discussion of the apparatus.

DETAILED DESCRIPTION OF THE APPARATUS

The base housing **11** is illustrated (FIGS. **1–4**, **6**) as substantially circular and hollow to enclose the fluid container **13**, pump assembly and at least portions of a control panel **24**. The base housing **11** could also be oval, rectangular, rectilinear or other shapes without departing from the scope of the invention. Preferably, the base housing **11** is constructed of an appropriate sheet metal such as 16 gauge cold rolled steel that is cut with a plasma cutting device to resemble an antique fueling device. Alternatively, materials commonly used in construction of modern automotive refueling stations **50** housings can be used. In this regard, any rigid material and enclosure which is resistant to hydrocarbon fuels could be employed.

In order to install, maintain and refill the apparatus, an access door **25** providing access to the interior space **12** of the apparatus is typically fabricated in conjunction with the base housing **11**. Typically, the access door **25** is attached to the base housing **11** by a continuous piano-type hinge or other secure hinge/swivel means. Opposite the piano hinge, typically a locking clasp or other securing device is provided on the access door **25** to selectively secure the access door **25** to the base housing **11** and restrict access to the interior space **12** of the apparatus.

In an embodiment of the invention illustrated in FIGS. **1–4** and **6**, a roof **26** in the approximate shape of a cone is provided on the base housing **11**. In alternate embodiments of the present invention, the roof **26** may be of flat, pitched, rounded or of other shape suitable for the desired appearance or additional functions served by roof **26**.

A display cap **27** or other decorative device can be provided on the exterior of the base housing **11**, as illustrated in FIGS. **1** and **6**. As desired, the display cap **27** can provide one or more display surfaces **28**. The illustrated shape of the display cap **27** in FIGS. **1** and **6** are circular and comprise two display surfaces **28**, but other shapes may be used with equal success. If the display cap **27** comprises two or more display surfaces **28**, the display surfaces **28** content may be similar or dissimilar. For example, the display surfaces **28** can provide content identifying the contents of the fluid container **13**, promoting the fuel station logo, or otherwise increasing the appeal of the windshield washer fluid dispenser **10** to prospective customers. The display cap **27** and display surfaces **28** thus provide a significant added advantage of visually displaying and promoting sale of the windshield washer fluid, especially when the apparatus is placed in a location which is adjacent to automotive refueling station **50**.

Optionally, a light source **29** can be positioned on or behind the display surfaces **28** for back lighting purposes. Typically, the light source **29** derives its electric power from the control panel **24**, although in certain installations it is desirable to provide a light source **29** capable of independent operation via battery power, solar energy, fuel cell or other power sources.

The fluid container **13** is preferably a separate element from the base housing **11**, although it could be made integral with the base housing **11** walls. The preferred fluid container

13 rests or is enclosed within the bottom portion of the base housing **11**, and is formed of an appropriate plastic or other chemically resistant material that is complementary to the cross-sectional shape of the base housing **11**. The fluid container **13** should be designed to hold a large volume of windshield washer fluid (approximately 30–50 gallons) to service a large number of vehicles before requiring refilling or replacement with a full replacement fluid container. A preferred fluid container **13** shown to be effective is a standard 55-gallon polyethylene barrel.

A top surface **30** of the fluid container **13** should provide openings for the intake line **16**, the first container line **21**, the second container line **23** and a vent line **31**, as well as an access bung if direct refilling (discussed below) is desired. The vent line **31** provides pressure equalization for the fluid container **13** while refilling the fluid container **13** or while discharging fluid from the fluid container **13**. The vent line **31** also provides pressure equalization of the fluid container **13** on the occasion that the apparatus is subjected to significant changes in environmental or thermal conditions.

While standard windshield washer fluid is typically capable of remaining in a liquid state in cold climates, in extremely cold climates it may become desirable to install a heater within the fluid container **13** to prevent the supply of windshield washer fluid **14** from freezing.

The pump **19** typically configured in the fluid pump assembly **15** is a conventional electric pump **19** that is mounted within the base housing **11**. Preferred results have been achieved by using a standard, flexible impeller, 115 VAC, 15 PSI, 4.5 gallon per minute pump **19**.

The input valve **20** and the output valve **22** are standard brass 3-way valves, utilizing standard plumbing components to provide a sealed environmental communication to the pump **19** and related lines (such as intake line **16**, first container line **21**, discharge line **17** and second container line **23**).

A hose length of approximately 15 feet is sufficient to serve as a discharge line **17** at an automotive refueling station **50**, though other lengths may be used with equal success. Installations in other locations, for example, at a car wash or automotive parts retailer may dictate other hose lengths.

If desired, a discharge line reel **32** can be mounted inside the interior space **12**, thereby allowing an customer to extend the discharge line **17** to a desired distance or length. When the customer is finished with the discharge line **17** and desires to return the discharge line **17** to the apparatus to its original configuration, the customer gently tugs the discharge line **17**, thereby engaging a spring within the discharge line reel **32** which substantially retracts the discharge line **17** onto a spool of the discharge line reel **32** and thereby into the interior space **12** of the apparatus.

A conventional-type nozzle is typically provided as a discharge valve **18** at the discharge end of the discharge line **17**. The nozzle can be any number of nozzles commercially available, as a manually operable or automatically operable. For example, such an automatic nozzle may include a conventional pressure sensor that will automatically disallow the flow of windshield washer fluid through the discharge valve **18** upon sensing that the vehicle windshield washer fluid reservoir **52** is full.

Two float switches, a tank empty float switch **48** and a tank full float switch **49**, are typically configured within the fluid container **13**, rendering information to the electronic circuitry of the apparatus as to the level of windshield washer fluid present in the fluid container **13**.

A tank empty indicator **33**, typically comprised of a conventional light bulb, is configured to illuminate on the access door **25** or otherwise alert a prospective customer when the tank empty float switch **48** reaches a specific level near the bottom of the fluid container **13**. In embodiments developed for a vending or retail environment, it is advantageous to configure the fluid pump assembly **15** to become disabled when the tank empty float switch **48** closes and the tank empty indicator **33** is lighted.

A tank full indicator **37**, comprised of a conventional light bulb similar to the tank empty indicator **33**, is also typically configured to illuminate or otherwise alert an owner when the tank full float switch **49** reaches a certain level near the top of the fluid container **13** during the refilling process.

The control panel **24** typically comprises one or more power outlets **34**, a pump switch **35**, the power indicator **36** and the tank full indicator **37**.

The pump switch **35** comprises a 3-way electrical switch configured to selectively energize the pump **19** for: (i) the refilling process, (ii) the discharging process or (iii) disabling the apparatus, (see FIGS. **3***b*, **4***b* and **5**.) In an "OFF" position, the switch prohibits any power from reaching the pump **19**. During normal operation, the pump switch **35** remains in a "DISPENSE" position, thereby only energizing the pump **19** through the timer **41**, (see FIG. **5**). During a refilling process wherein the fluid pump assembly **15** is to be utilized, the switch will be selectively configured to a "REFILL" position thereby energizing the pump **19**, (see FIG. **5**).

The power indicator **36** on the control panel **24** confirms that the apparatus is receiving electrical current from a power source **38**, which may be either external or internal. Preferably, electrical circuits within the apparatus are configured for utilization of 110 volt alternating current readily available in North America, although the apparatus could be alternatively configured for other electrical power voltages or configurations encountered abroad. In yet other embodiments of the present invention, the apparatus could be configured to operate from batteries, solar power, fuel cells or a combination of these and other conventional energy sources rendering electric current.

Fuses or circuit breakers, as more particularly illustrated in FIG. **5**, should be installed within the electronic circuitry of the apparatus to meet regulations and provide safety and resistance to power surges, electrical overloads and failures that may occur in electrical components, as well as other unexpected electrical anomalies.

In order for the windshield washer fluid dispenser **10** to restrict use to certain authorized customers, the apparatus should include a means of authorizing use **39**. The means of authorizing use **39**, in various embodiments, can be based upon a diversity of specific conditions that must be satisfied before rights of usage are granted—such as the status of rendering payment, successful manipulation of a lock, identification of the customer, time of day/week, or other desired conditions.

In a preferred embodiment, the means of authorizing use **39** is comprised of a coin acceptor **40** mounted on the inside of the access door **25** and a timer **41** mounted inside the control panel **24**. The coin acceptor **40** is a standard "cherry lever" coin accepter, typically accepting only quarters and discharging both coins below the coin acceptor **40**. To catch the falling coins, the coin acceptor **40** preferably has a coin box **42** which is mounted below the coin acceptor **40**. Typically, a metal box 3"×3"×6" has been found suitable for capturing and holding a quantity of coins until the apparatus is serviced or a refilling process is required. It is advanta-

geous to make such a coin box **42** removable, such that an owner is capable of dumping the contents into a larger coin collection bag.

The timer **41** is typically mounted in the control panel **24** for protection from the supply of windshield washer fluid **14**, humidity and other undesirable elements that may cause the timer **41** to fail.

In the preferred embodiment, when quarters are deposited into the coin acceptor **40**, each quarter trips a small switch which sends an electrical pulse to the timer **41**. The electrical pulses, based on the configuration of the timer **41**, invoke the timer **41** to energize the pump **19** for a specified period of time. The specified period of time that the machine will stay operative depends on the number of quarters that were deposited by the customer and the configuration of the timer **41**. When the time configured by the timer **41** runs out, the circuit providing power to the pump **19** through the timer **41** is opened and thus power is cut-off.

In alternate embodiments, the timer **41** can also be configured to only energize the pump **19** only during certain periods of the day, certain days of the week, or other various conditions as desired by the owner.

In yet another embodiment, operation of the present system could be integrated with conventional card scanner or retail transaction systems that are currently in use at fueling stations. Such a credit card transaction alleviates the need for depositing currency or coins as described above. As desired by the owner, embodiments of the present apparatus could also be configured to integrate with a centralized retail or transaction system at an automotive refueling station **50**.

FIG. **6** shows, in schematic form, an alternate preferred installation for the apparatus located next to a conventional automobile refueling station **50**, illustrating how a conventional credit card scanner is utilized as a means of authorizing use **39**.

In vending and retail embodiments, it is advantageous that the windshield washer fluid flow through the discharge line **17** at a desired and consistent flow rate. As the pump **19** typically provides a flow rate in excess of that necessary to provide to a customer, embodiments of the apparatus are typically configured with an appropriate flow restrictor **45** (FIG. **3***a*) to restrict the flow of windshield washer fluid through the discharge line **17** at a specific maximum flow rate. Typically, it has been demonstrated that a flow restrictor **45** restricting the flow of windshield washer fluid to 1.5 gallons per minute is sufficient for use in installations at automotive refueling stations **50**, though this rate could be greater or lesser depending upon the embodiment and application of the present invention.

Likewise, in vending or retail embodiments, it is also advantageous to provide a means for the owner to audit: (i) the total volume of windshield washer fluid discharged and (ii) the total amount of currency received by the apparatus.

To solve the former task, a totalizer **46** should be installed in environmental communication with the discharge line **17** at any convenient location between the discharge line **17** and the output valve **22**, thereby requiring that any windshield washer fluid to be dispensed through the discharge line **17** must first pass through the totalizer **46**. The totalizer **46** is typically a standard fluid volume metering device that cannot be reset, though in various installations it is advantageous to provide a significantly more sophisticated totalizer **46** capable of rendering additional information regarding the discharge of fluid from the apparatus.

To solve the latter task of monitoring the total amount of physical currency received by the windshield washer fluid dispenser **10**, it is recommended that a coin counter **47** be installed in the apparatus. The coin counter **47** is typically a standard counting device linked to the means of authorizing use **39**, (or coin acceptor **40**, if installed), that perpetually counts the currency deposited to the machine. Like the totalizer **46**, the coin counter **47** cannot be reset. Given the benefit of information provided by the totalizer **46** and the coin counter **47**, an owner possesses the capability of reconciling the volume of windshield washer fluid discharged with the currency deposited, thereby discouraging misuse of the apparatus or undisclosed theft of revenues generated by the apparatus.

In yet another embodiment, the apparatus could be configured to operate without payment or calculations, but instead require that a customer possess or present certain credentials or identification, (such as a key, an ID card, passcode or other form of identification). Such embodiments are desirable in installations where there is no need to collect charges for the windshield washer fluid. Private garages or commercial fleet owners could make use of such embodiments. Other commercially available devices providing automated means of verifying or rejecting identification include magnetic card readers, optical card readers, handprint/fingerprint scanners, eye/retina scanners, facial recognition devices, mobile phone signal receivers, infrared signature scanners or other advanced technology means can be utilized as a means of authorizing use in the present apparatus, as desired.

When commercializing an embodiment of the disclosed apparatus, the embodiment should be tested and certified by Underwriters Laboratory (UL) or a similar independent laboratory for environmental conditions and safety. Such independent laboratories would typically test the embodiment of the present invention for vulnerabilities due to exposure to various environmental elements, heat, ground continuity, shock, flammability, etc.

As the flashpoint on standard windshield washer fluids is typically low, (less than 100 degrees Fahrenheit), standard windshield washer fluids are characterized as a "flammable" liquid. As an automotive refueling station **50** is not an optimal location to handle or dispense flammable windshield washer fluid, it is advantageous to take precautions necessary to minimize the additional risks posed by installation of a windshield washer fluid dispenser. In this regard, the present apparatus is intended, though not necessarily required, to be utilized with windshield washer fluid that has a flashpoint above 100 degrees Fahrenheit. The increased flashpoint of the supply of windshield washer fluid **14** decreases the risk of flammability of the apparatus or its contents while continuing to serve its intended purposes.

If the windshield washer fluid utilized in the present apparatus has a flashpoint exceeding 100 degrees, the preferred embodiment as disclosed above conforms to UL Safety Standard 751, distinguishing the present windshield washer apparatus, (notwithstanding other distinguishing features as disclosed herein), from all other windshield washer fluid dispensers presently available. Since the windshield washer fluid developed for the preferred embodiment of the present invention has a higher flashpoint than that of ordinary retail windshield washer fluid, windshield washer fluid dispensers and vehicles that are filled with the new and improved windshield washer fluid as disclosed by the present invention are safer than apparatuses and vehicles that are filled with standard windshield washer fluids.

DETAILED DESCRIPTION OF THE REFILLING PROCESS

After installation of the apparatus, and from time to time, it is necessary to refill the fluid container **13** with a supply of windshield washer fluid **14**. As described above, it is advantageous to replenish the fluid container **13** with fluid having a flashpoint in excess of one hundred degrees Fahrenheit. There are two principal methods to refill the fluid dispenser, namely pouring fluids directly into the fluid container **13** or alternatively pumping fluids into the fluid container **13** via the intake line **16** and the fluid pump assembly **15**.

In order to refill the fluid container **13** by either method, an owner must first open the access door **25** of the base housing **11** to gain access to the interior space **12** of the apparatus.

To directly fill the fluid container **13** by the former method, the fluid container **13** must provide an access bung (or other access means) to allow the direct transfer of fluid into the fluid container **13**. If such an access bung is available, the method of refilling the fluid container **13** by direct transfer is rather straight-forward. By example, the owner would transfer windshield washer fluid into the reasonably empty fluid container **13** by conventional means of pouring, pouring through a funnel, siphon, gravity feed, etc. Alternatively, if water is to be used as a windshield washer fluid, the owner fills the apparatus by directing water from a conventional water hose connected to a faucet into the fluid container **13**.

The second method of refilling the fluid container **13** provides that windshield washer fluid or other fluids are pumped into the fluid container **13**. After opening the access door **25** of the base housing **11**, the owner acquires the intake line **16**, and confirms or otherwise connects one end of the intake line **16** to the input valve **20**, (as necessary). The owner then places the free end of the intake line **16** into an external bulk container **60** containing the desired fluid to be transferred.

Next, both the input valve **20** and the output valve **22** are configured to respective "REFILL" positions, (see FIGS. **4***a*, **4***c*, **4***d*). On the input valve **20**, the "REFILL" position provides that the input valve **20** provides an environmental communication for fluid between the intake line **16** and the pump **19**, thereby accepting incoming fluid from the intake line **16** (and not the first container line **21**) and directing the fluid to the pump **19**. In the "REFILL" position, the output valve **22** provides a communication for fluid between the pump **19** and the second container line **23**, thereby accepting fluid from the pump **19** and directing the fluid to the second container line **23** (and not the discharge line **17**).

Having configured the input valve **20** and output valve **22** in their respective "REFILL" positions, the owner then switches the pump switch **35** to its "REFILL" position (see FIGS. **4***a*, **4***b*) thereby energizing the pump **19**. Fluid thereby travels from the external bulk container **60** through the intake line **16** and through a intake line check valve **43** configured either on the intake line **16** or the input valve **20**, (see FIG. **4***a*). The intake line check valve **43** prevents accidental leakage of fluid properly contained in the fluid container **13** from leaking by siphon or other inadvertent means. The fluid then travels into and through the first input valve **20**, properly configured to direct the fluid to the pump **19**. After traveling through the pump **19** the fluid travels through the output valve **22**, properly configured to direct the fluid into the second container line **23** and the fluid container **13**.

Based on tests performed by the inventors, transferring a typical desired volume of 40–50 gallons of fluid will take 10–15 minutes to complete. Following the transfer of a desired volume of fluid into the fluid container **13**, the owner switches the pump switch **35** to its "DISPENSE" position (see FIGS. **3***a*, **3***b*). The intake hose is subsequently removed from the external bulk container **60** (and disconnected from the fluid pump assembly **15**, if desired), and stowed inside the base housing **11** (or stored in an alternate convenient location).

By either of the above described methods, the owner then secures the access door **25** and the refilling process is complete. Properly configured, the apparatus can now be utilized to discharge the supply of windshield washer fluid **14**, which shall now be discussed in further detail.

DETAILED DESCRIPTION OF THE DISCHARGING PROCESS

In a typical scenario of discharging windshield washer fluid with an embodiment of the apparatus, a customer drives a vehicle **51** to an automotive refueling station **50** to refuel. After commencing the refueling process, the customer typically has extra time to spend, opening a hood **53** of the automobile and checking various fluid levels. One such task is checking, and refilling if necessary, the level of the windshield washer fluid in the vehicle windshield washer fluid reservoir **52**.

Once the customer determines that there is a need for additional windshield washer fluid to transfer into the vehicle windshield washer fluid reservoir **52**, the customer approaches the windshield washer fluid dispenser **10**.

While a variety of means of authorizing use **39** are implemented in various embodiments of the apparatus, typically the customer inserts coins into the apparatus. The means of authorizing use **39** thereby energizes the fluid pump assembly **15** for a specified period of time, whereby the customer may refill the vehicle windshield washer fluid reservoir **52** through the discharge line **17**. More particularly, the customer acquires the discharge line **17** and places a portion of the discharge nozzle above or within the vehicle windshield washer fluid reservoir **52**. The customer selectively engages the discharge valve **18** to permit windshield washer fluid to flow through the discharge line **17** into the vehicle windshield washer fluid reservoir **52**.

More particularly, a quantity of the supply of windshield washer fluid **14** will travel from the fluid container **13**, through a container line check valve **44**, through the first container line **21** and through the input valve **20** into the pump **19**. Exhausted through the output side of the pump **19**, the fluid will then travel through the output valve **22**, through the totalizer **46** and into and through the flow restrictor **45**. After the fluid passes through the flow restrictor **45**, it travels into and through the discharge line **17**, selectively discharged through the discharge valve **18** at the discharge end—into the vehicle windshield washer fluid reservoir **52**.

When a desired volume of the supply of windshield washer fluid **14** has been discharged into the vehicle windshield washer fluid reservoir **52**, the customer returns the discharge line **17** to its original configuration at the windshield washer fluid dispenser **10** and secures the hood **53** of the vehicle **51**.

In any of the operational situations described above, and equivalents thereof, the apparatus and discharge process described are advantageous for the customer in that the amount of windshield washer fluid rendered is the exact

amount desired to fill the vehicle windshield washer fluid reservoir **52**, obviating the need to dispose, store or transport excess windshield washer fluid. Further, if the apparatus is installed at an automotive refueling station **50**, the customer may tend to filling his/her vehicle windshield washer fluid reservoir **52** while waiting for the process of refueling to complete, circumventing the need effect an additional retail transaction for the purchase of a traditional bottle of windshield washer fluid at a retail counter.

The disclosed embodiments of the present invention derive significant benefits that have not been exhibited by other fluid dispensers publicly disclosed to date, including but not limited to ease of manufacture, reliability, convenience, auditing capabilities and safety of the present invention.

Numerous modifications and variations of the present invention are possible in light of the above teachings. In compliance with the statute, the invention has been described in language more or less specific as to structural and methodical features. Therefore, it is further understood that the invention is not limited to the specific features shown and described, since the means herein disclosed comprise preferred forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted in accordance with the doctrine of equivalents.

The invention claimed is:

1. A windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir, comprising:

a base housing with an interior space defined by the base housing;

a roof disposed on the base housing;

a means to access the interior space of the base housing;

a power source capable of rendering electric current to operate the apparatus;

a fluid container within the interior space, the fluid container capable of containing a supply of windshield washer fluid;

an intake line environmentally communicating with an input valve;

a discharge line environmentally communicating with an output valve leading to a discharge end thereof, the discharge line being of sufficient length to extend from the windshield washer fluid dispenser to the vehicle windshield washer fluid reservoir;

a discharge valve in the discharge line adjacent to the discharge end, the discharge valve being selectively operable between an open discharge condition and a closed retention condition;

a first container line environmentally communicating with the input valve and the fluid container;

a second container line environmentally communicating with the output valve and the fluid container;

a fluid pump assembly, configurable to refill the contents of the fluid container or discharge the contents of the fluid container, further comprising the input valve, the first container line, the output valve, the second container line and a pump, wherein the pump environmentally communicates with the input valve and the output valve; and

a means for authorizing use of the windshield washer fluid dispenser.

2. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the fluid container is removable from the base housing.

3. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a supply of windshield washer fluid contained within the fluid container.

4. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a supply of windshield washer fluid contained within the fluid container having a flashpoint in excess of one hundred degrees Fahrenheit.

5. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the means for authorizing use comprises a device accepting coins or bills.

6. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the means for authorizing use comprises an automotive refueling station transaction system.

7. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the means for authorizing use comprises a credit card scanner.

8. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the means for authorizing use comprises a means of verifying identification.

9. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the means for authorizing use is located outside the interior space.

10. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the power source is a standard 110 volts alternating current.

11. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, wherein the power source is one or more from the group consisting of batteries, photovoltaic cells and fuel cells.

12. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a display cap and one or more display surfaces.

13. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a display cap, one or more display surfaces and a light source.

14. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a discharge line reel.

15. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising an intake line check valve to prevent accidental leakage of windshield washer fluid.

16. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a container line check valve configured with the first container line.

17. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a flow restrictor.

18. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a totalizer configured to

monitor the total volume of windshield washer fluid discharged from the discharge line.

19. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **1**, further comprising a coin counter configured to monitor the total currency or coins collected by the means for authorizing use.

20. A process for refilling a windshield washer fluid dispenser, comprising the steps of:

providing a windshield washer fluid dispenser as defined by claim **1**;

gaining access to the interior space of the windshield washer fluid dispenser;

acquiring the intake line, connecting one end of the intake line to the input valve and placing the other end of the intake line into a bulk external container with a quantity of fluid to be transferred to the fluid container;

configuring the fluid pump assembly into a "REFILL" configuration thereby capable of transferring the quantity of fluid into the intake line, through the input valve, through the pump, through the output valve, through the second container line and into the fluid container; and

switching the pump switch to a "REFILL" position thereby engaging the pump, causing a desired volume of the quantity of fluid to flow into the fluid container.

21. A process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir, comprising the steps of:

providing a windshield washer fluid dispenser and a vehicle windshield washer fluid reservoir as defined by claim **1**;

obtaining authorization to use the windshield washer fluid dispenser;

extending the discharge line from the windshield washer fluid dispenser to the vehicle windshield washer fluid reservoir; and

selectively utilizing the discharge valve thereby permitting flow of the windshield washer fluid from the windshield washer fluid dispenser into the vehicle windshield washer fluid reservoir.

22. The process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir as defined by claim **21**, wherein obtaining authorization to use the windshield washer fluid dispenser comprises inserting coins into a coin acceptor disposed on the windshield washer fluid dispenser.

23. The process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir as defined by claim **21**, wherein obtaining authorization to use the windshield washer fluid dispenser comprises scanning a credit card into the means of authorizing use of the windshield washer fluid dispenser.

24. A windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir, comprising:

a base housing with an interior space defined by the base housing;

a display cap with one or more display surfaces;

an access door providing access to the interior space of the base housing;

a power source capable of rendering electric current to operate the apparatus;

a fluid container within the interior space, the fluid container capable of containing a supply of windshield washer fluid;

a supply of windshield washer fluid contained within the fluid container, wherein the supply of windshield washer fluid has a flashpoint above one hundred degrees Fahrenheit;

an intake line environmentally communicating with an input valve;

a discharge line environmentally communicating with an output valve leading to a discharge end thereof, the discharge line being of sufficient length to extend from the windshield washer fluid dispenser to the vehicle windshield washer fluid reservoir;

a discharge valve in the discharge line adjacent to the discharge end, the discharge valve being selectively operable between an open discharge condition and a closed retention condition;

a flow restrictor environmentally communicating with the discharge line;

a first container line environmentally communicating with the input valve and the fluid container;

a second container line environmentally communicating with the output valve and the fluid container;

an intake line check valve to prevent accidental leakage of windshield washer fluid;

a container line check valve configured upon the second container line;

a fluid pump assembly, configurable to refill the contents of the fluid container or discharge the contents of the fluid container, further comprising the input valve, the first container line, the output valve, the second container line and a pump, wherein the pump environmentally communicates with the input valve and the output valve;

a tank empty indicator disposed upon the access door;

a tank empty float switch disposed within the fluid container communicating with the tank empty indicator;

a totalizer configured to monitor the total volume of windshield washer fluid discharged from the discharge line; and

a means for authorizing use of the windshield washer fluid dispenser.

25. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **24**, wherein the means for authorizing use comprises a device accepting coins or bills.

26. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **24**, wherein the means for authorizing use comprises an automotive refueling station transaction system.

27. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **24**, wherein the means for authorizing use comprises a credit card scanner.

28. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **24**, wherein the means for authorizing use comprises a means of verifying identification.

29. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **24**, wherein the means for authorizing use is located outside the interior space.

30. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **24**, wherein the power source is one or more from the group consisting of batteries, photovoltaic cells and fuel cells.

31. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined

by claim **24**, further comprising a coin counter configured to monitor the total currency or coins collected by the means for authorizing use.

32. A process for refilling a windshield washer fluid dispenser, comprising the steps of:

providing a windshield washer fluid dispenser as defined by claim **24**;

gaining access to the interior space of the windshield washer fluid dispenser;

acquiring the intake line, connecting one end of the intake line to the input valve and placing the other end of the intake line into a bulk external container with a quantity of fluid to be transferred to the fluid container;

configuring the fluid pump assembly into a "REFILL" configuration thereby capable of transferring the quantity of fluid into the intake line, through the input valve, through the pump, through the output valve, through the second container line and into the fluid container; and

switching the pump switch to a "REFILL" position thereby engaging the pump, causing a desired volume of the quantity of fluid to flow into the fluid container.

33. A process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir, comprising the steps of:

providing a windshield washer fluid dispenser and vehicle windshield washer fluid reservoir as defined by claim **25**;

obtaining authorization to use the windshield washer fluid dispenser;

extending the discharge line from the windshield washer fluid dispenser to the vehicle windshield washer fluid reservoir; and

selectively utilizing the discharge valve thereby permitting flow of the windshield washer fluid from the windshield washer fluid dispenser into the vehicle windshield washer fluid reservoir.

34. The process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir as defined by claim **33**, wherein obtaining authorization to use the windshield washer fluid dispenser comprises inserting coins into a coin acceptor disposed on the windshield washer fluid dispenser.

35. The process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir as defined by claim **33**, wherein obtaining authorization to use the windshield washer fluid dispenser comprises scanning a credit card into the means of authorizing use of the windshield washer fluid dispenser.

36. A windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir, comprising:

a base housing with an interior space defined by the base housing;

a roof disposed on the base housing;

a display cap with one or more display surfaces and a light source;

an access door providing access to the interior space of the base housing;

a power source capable of rendering electric current to operate the apparatus;

a fluid container within the interior space, the fluid container capable of containing a supply of windshield washer fluid;

a supply of windshield washer fluid contained within the fluid container;

an intake line environmentally communicating with an input valve;

a discharge line environmentally communicating with an output valve leading to a discharge end thereof, the discharge line being of sufficient length to extend from the windshield washer fluid dispenser to the vehicle windshield washer fluid reservoir;

a discharge valve in the discharge line adjacent to the discharge end, the discharge valve being selectively operable between an open discharge condition and a closed retention condition;

a flow restrictor environmentally communicating with the discharge line;

a first container line environmentally communicating with the input valve and the fluid container;

a second container line environmentally communicating with the output valve and the fluid container;

an intake line check valve to prevent accidental leakage of windshield washer fluid;

a container line check valve configured upon the second container line;

a fluid pump assembly, configurable to refill the contents of the fluid container or discharge the contents of the fluid container, further comprising the input valve, the first container line, the output valve, the second container line and a pump, wherein the pump environmentally communicates with the input valve and the output valve;

a control panel disposed within the interior space providing a power indicator and one or more power outlets;

a tank empty indicator disposed upon the access door;

a tank full float switch disposed within the fluid container communicating with a tank full indicator;

a tank empty float switch disposed within the fluid container communicating with the tank empty indicator;

a totalizer configured to monitor the total volume of windshield washer fluid discharged from the discharge line;

a means for authorizing use of the windshield washer fluid dispenser; and

a coin counter configured to monitor the total currency or coins collected by the means for authorizing use.

37. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the fluid container is removable from the base housing.

38. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the means for authorizing use comprises a device accepting coins or bills.

39. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the means for authorizing use comprises an automotive refueling station transaction system.

40. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the means for authorizing use comprises a debit card or credit card scanner.

41. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the means for authorizing use comprises a means of verifying identification.

42. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the means for authorizing use is located outside the interior space.

43. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the power source is a standard electrical current of 110 volts alternating current.

44. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the power source is one or more from the group consisting of batteries, photovoltaic cells and fuel cells.

45. The windshield washer fluid dispenser for selectively filling a vehicle windshield washer fluid reservoir as defined by claim **36**, wherein the flow constrictor is one and a half gallons per minute.

46. A process for refilling a windshield washer fluid dispenser, comprising the steps of:

providing a windshield washer fluid dispenser as defined by claim **36**;

gaining access to the interior space of the windshield washer fluid dispenser;

acquiring the intake line, connecting one end of the intake line to the input valve and placing the other end of the intake line into a bulk external container with a quantity of fluid to be transferred to the fluid container;

configuring the fluid pump assembly into a "REFILL" configuration thereby capable of transferring the quantity of fluid into the intake line, through the input valve, through the pump, through the output valve, through the second container line and into the fluid container; and

switching the pump switch to a "REFILL" position thereby engaging the pump, causing a desired volume of the quantity of fluid to flow into the fluid container.

47. A process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir, comprising the steps of:

providing a windshield washer fluid dispenser and vehicle windshield washer fluid reservoir as defined by claim **36**;

obtaining authorization to use the windshield washer fluid dispenser;

extending the discharge line from the windshield washer fluid dispenser to the vehicle windshield washer fluid reservoir; and

selectively utilizing the discharge valve thereby permitting flow of the windshield washer fluid from the windshield washer fluid dispenser into the vehicle windshield washer fluid reservoir.

48. The process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir as defined by claim **47**, wherein obtaining authorization to use the windshield washer fluid dispenser comprises inserting coins into a coin acceptor disposed on the windshield washer fluid dispenser.

49. The process for discharging windshield washer fluid directly to a vehicle windshield washer fluid reservoir as defined by claim **47**, wherein obtaining authorization to use the windshield washer fluid dispenser comprises scanning a credit card into the means of authorizing use of the windshield washer fluid dispenser.

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